

Astra Quasar

Technical User Manual



Astra Quasar Technical User Manual

Astra Quasar is the Astra Wireless devices family, is used for deployment of wireless Point-to-Point links in 4900 - 7100 MHz frequency range, with a maximal performance of up to 2.1 Gbps in 160 MHz band.

Astra Quasar family combines the wide network functionality of previous generations devices with cutting-edge development in the communication system performance.

About This Manual

This manual provides detailed technical information for the **Astra Quasar** families devices, including system specifications, installation, commissioning, maintenance and troubleshooting.

The document is intended to be used by qualified RF engineers/technicians and IT professionals. Qualified personnel should have skills and experience with:

- Outdoor/indoor radio equipment installation
- Outdoor wireless networks
- TCP/IP networking protocols
- Safety procedures and instructions for installing antenna equipment
- Professional manipulation with electrical equipment and accessories
- Safety procedures and instructions for working at height.

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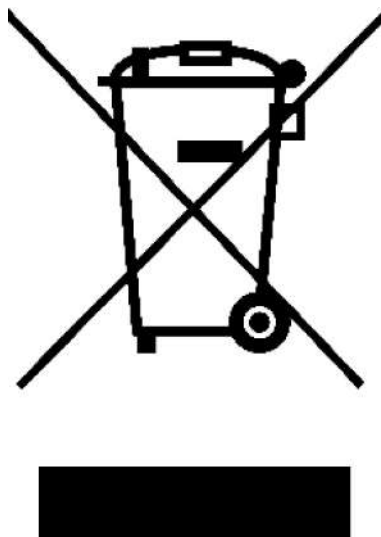
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Introduction

Document structure

This document consists of the following chapters:

- Introduction - presents the information about this document's purpose and structure.
- Planning considerations - describes the principles of wireless system planning.
- Installation - describes the steps to be taken when installing the equipment at the installation sites and installation site requirements.
- Operation & Administration - presents the functionalities of the web interface, a simple and efficient way to monitor the device status, configure and maintain the equipment.
- Troubleshooting - describes the actions to be taken during occurred problems investigation.

Document marks

CAUTION All caution warnings are marked with a special warning sign. One should pay a great deal of attention to what is written in the Caution section.
NOTE All notes are marked with a special note sign. Notes usually contain useful comments or hints to the described section of the document.



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Key Features

Astra Quasar is a wireless point-to-point solution with an impressive maximal performance of up to 2,1 Gbps, a packet performance is up to 500 000 pps.

Astra Quasar operates in frequency range from 4900 MHz to 6060 MHz for QSR5, from 6000 MHz to 7100 MHz for QSR6 and supports the channel width 20, 40, 80MHz. Astra Quasar is a fixed point to point device.

Radio

- **Automatic Modulation Control (AMC)** – modulation control algorithm selects the most appropriate modulation-coding scheme in order to maximize the link performance.
- **Automatic Repeat Request (ARQ)** – a technology which enables packet re-transmission in case of previous unsuccessful delivery, allows to achieve reliable connectivity even in highly congested spectrum.
- **Automatic Transmit Power Control (ATPC)** – a technology which allows to extend the life of devices and optimize energy consumption.
- **Automatic range detection** - the guard interval optimal for the actual distance is automatically determined.

Networking*

- MAC/IP filtering.
- RIPv2 / OSPFv2 /static routing.
- Tunneling (Ethernet-over-IP, IP-over-IP).
- L2/L3 Firewall.
- NAT (multipool, H.323-aware).
- DHCP client/server/relay.
- Stacked VLAN support (Q-in-Q) avoids the limitation in the number of available VLANs (4096), which can be useful for large networks. In addition, Q-in-Q allows you to organize L2 channels within a limited VLAN list, which is widely used in provider networks and on leased communication channels.

Quality of Service*

- 17 priority queues.
- IEEE 802.1p support.
- IP TOS / DiffServ support.
- Full voice support.
- Traffic limiting (absolute, relative, mixed).
- Traffic redirection.

Environment

- Operating temperature range -40 ... +60 °C, in arctic edition: -55 ... +60 °C.
- Dust and water protection in compliance with IP66/IP67.
- Wind load up to 160 kph - operation, 200 kph - survival.

Power

The device has following electrical parameters:

- Consumption is up to 20 W.
- Power options: 110-240 VAC~ @ 50/60 Hz, $\pm 43..56$ VDC.
- 802.3at support or proprietary passive PoE.
- AC/DC injector: IDU-CPE-G(24W) is included to the packing list.

*Pending

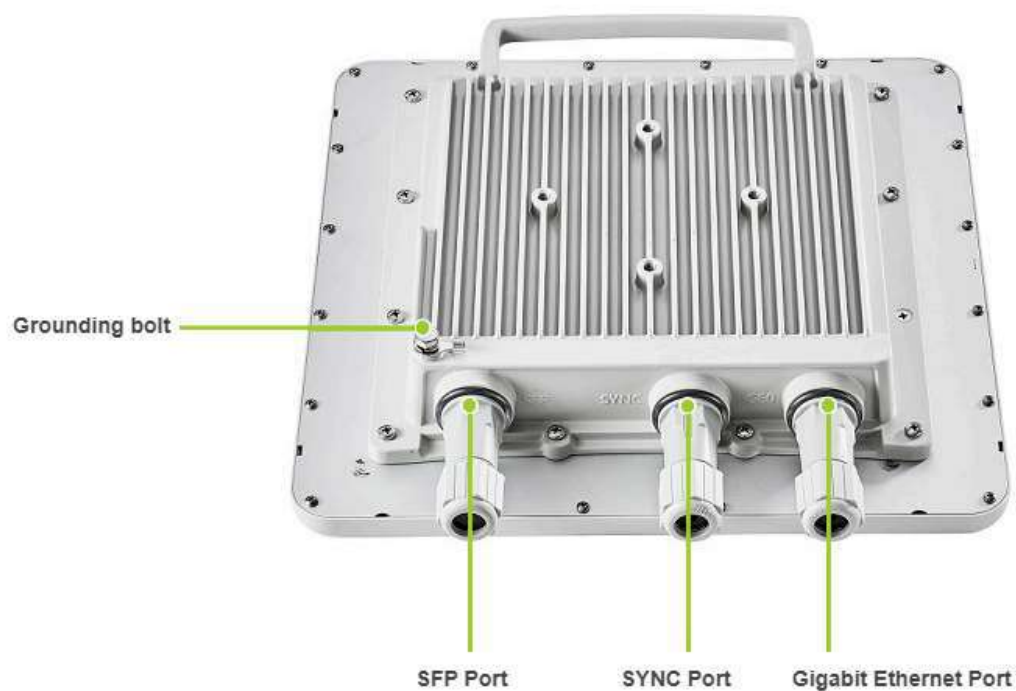
Hardware Platform

Wireless device

The wireless device contains both the radio and networking electronics. Implemented in a robust all-weather metal enclosure, this equipment can be used to create point-to-point wireless links at long distances. The wireless device is supplied in the following configurations:

- with removable integrated antenna 26 dBi (QSR5-26 / QSR6-26);
- with removable integrated antenna 29 dBi (QSR5-29 / QSR6-29);
- with two N-type ports for an external antenna (QSR5-E / QSR6-E).





The enclosure has three ports:

1x Combo port including:

- 1x Gigabit Ethernet port (10/100/1000 Base-T), RJ-45 connector: Data + Power.
- 1x SFP port: Data.

1x SYNC port - not used in this configuration.

Interface	Description
Gigabit Ethernet	RJ-45 socket for connecting to power supply and data transmission. The network connection to the wireless device is made via a 1000Base-T (Gigabit) Ethernet connection. Power is provided to the device over the 1000Base-T Ethernet connection using a standard IEEE 802.3at passive PoE power supply.
SFP	External optical Gigabit port 1000Base-X for plugging of the optical SFP transceiver module.

**NOTE**

Power and wired statuses indication is performed via glassy plug of the cable gland.

State	Status	Description
Flash	Initialization	The LEDs on both ports light up with white on second. Then LEDs check is performed: red, blue, green are lightened up sequentially.
Flash	Loading	Only for Gigabit Ethernet port: at the beginning green is lightened a few seconds, on the second loading stage switches to blue.
ON/Blue	Power	Only for Gigabit Ethernet port.
ON/Green	Speed 1000 Mbps	
ON/Green	ERConsole stage	Port with the established link lights up with green, the second port remains blue.
ON/Red	Speed 10 Mbps	Only for Gigabit Ethernet port.
ON/Yellow	Speed 100 Mbps	Only for Gigabit Ethernet port.



Power supply

Indoor AC/DC injector IDU-CPE-G(24W)



IDU-CPE-G(24W) is an indoor Gigabit PoE injector which supports 100-240 V input range from the AC mains. IDU-CPE-G(24W) feeds 48 VDC power to the device by injecting it to the CAT5 Ethernet cable.

Parameter	Description
Compatible models	Astra Quanta and Astra Evolution (except E5-BSQ), AUX-ODU-SYNC
Size and weight	97×53.5×33.5 mm, 0.133 kg
Connectors and Interfaces	• "LAN" - Ethernet input (Data only) • "POE" - Ethernet output (Data+VDC), PASSIVE PoE • "PWR" - AC Input
Supported Ethernet Modes	10/100/1000 Mbps
Standards	• IEEE 802.3 10Base-T • IEEE 802.3U 100Base-TX • IEEE 802.3ab 1000Base-T
Input Power Requirements	• AC Input Voltage: 100 ... 240 VAC • AC Input Current: 0.75 A • AC Frequency: 50 to 60 Hz
Consumption	28 W
Operating temperature range	-10 °C ... +40 °C
Operating humidity	Maximum 95 %, Non-condensing
Storage temperature	-40 °C ... +70 °C
Output Power Voltage	48 VDC, 0.5 A
Safety	UL cUL, CE, GS, CCC, FCC, S-MARK, PSE, C-tick, KC(48V0.5A) BIS (24V1A)

Ethernet Connectors Pin-out

Pin	LAN	POE
1	A+	A+
2	A-	A-
3	B+	B+
4	C+	C+
5	C-	+VDC/ C-
6	B-	B-
7	D+	-VDC / D+
8	D-	-VDC / D-

Indoor DC/DC injector for all Astra Wireless' units with integrated lightning protection IDU-LA-G(V.01)

IDU-LA-G(V.01) is an indoor DC/DC injector. It greatly reduces complexity of the deployment in the cases where DC source is available thus reducing both capital expenditures and total cost of ownership.

IDU-LA-G(V.01) may be used for the following purposes:

- To serve as a line protection unit for indoor network equipment connected to the second Ethernet port on ODU.
- To connect third-party DC power sources to ODU (for example, to power the unit from solar power or wind power sources).

Technical parameters

Parameter	Description
Compatible models	Astra Quanta, Astra Evolution, Astra Quasar
Output Voltage	The same as input
Supported Ethernet Modes	10/100/1000 Mbps (Gigabit Ethernet pass-through)
Pin assignment and polarity	1/2 (+), 3/6 (-), 4/5 (+), 7/8 (-)
Size and Weight	115×65×40 mm, 0.15 kg
Operating temperature range	From 0°C to +40°C

CAUTION

Exposing unit to the unsupported voltage will result in irreparable damage to the unit!
Always observe power requirements!

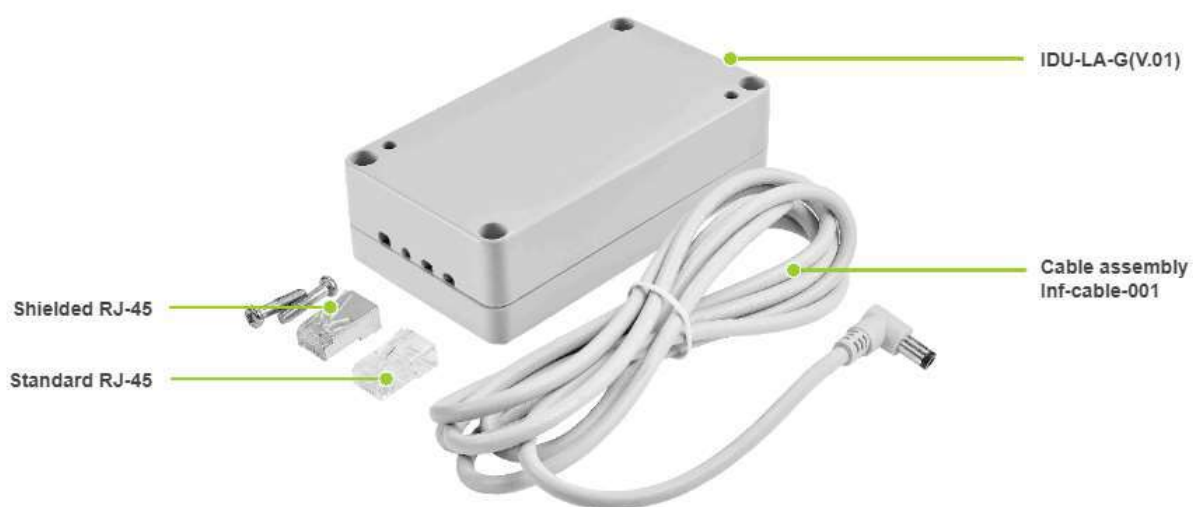
Connectors description



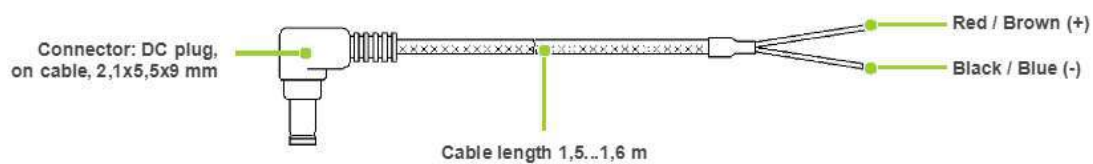
Mounting holes sizes



IDU-LA-G(V.01) Packing List



Cable assembly



Lightning Protection Unit with Injector AUX-ODU-INJ-G



Optional indoor/outdoor DC injector with built-in lightning protection. It greatly reduces complexity of the deployment in the cases where DC source is available on the rooftop eliminating the need of weather-sealed cabinets. AUX-ODU-INJ-G is compatible with all Astra Wireless devices.

Parameter	Description
Size and Weight	34×94×121 mm, 0.28 kg
Connectors and Interfaces	• ETH IN - Ethernet input • ETH OUT - Ethernet output (data+VDC, protected leg) • PWR - DC Input • GND - Ground clamp
Supported Ethernet Modes	10/100/1000 Mbps (Gigabit Ethernet pass-through)
Water and Dust Protection	IP66 and IP67
Operating temperature range	-55 °C ... +60 °C
DC Range	±43...±56 VDC
Lightning Protection	In compliance with: • GR-1089 • IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact) • IEC 61000-4-4 (EFT) 40A (tp = 5/50ns) • IEC 61000-4-5 (Lightning) L5, 95A (tp = 8/20us) • ETSI ETS 300 386

 CAUTION

Using inappropriate DC source will damage the ODU, which will be not covered by warranty

Ethernet Connectors Pin-out

Pin	LAN	POE
1	Data pair A+	Data pair A+
2	Data pair A-	Data pair A-
3	Data pair B+	Data pair B+
4	Data pair C-	+VDC + Data pair C-
5	Data pair C+	+VDC + Data pair C+
6	Data pair B-	Data pair B-
7	Data pair D+	-VDC + Data pair D+
8	Data pair D-	-VDC + Data pair D-

Packing List



Block



Cable glands



Clamps

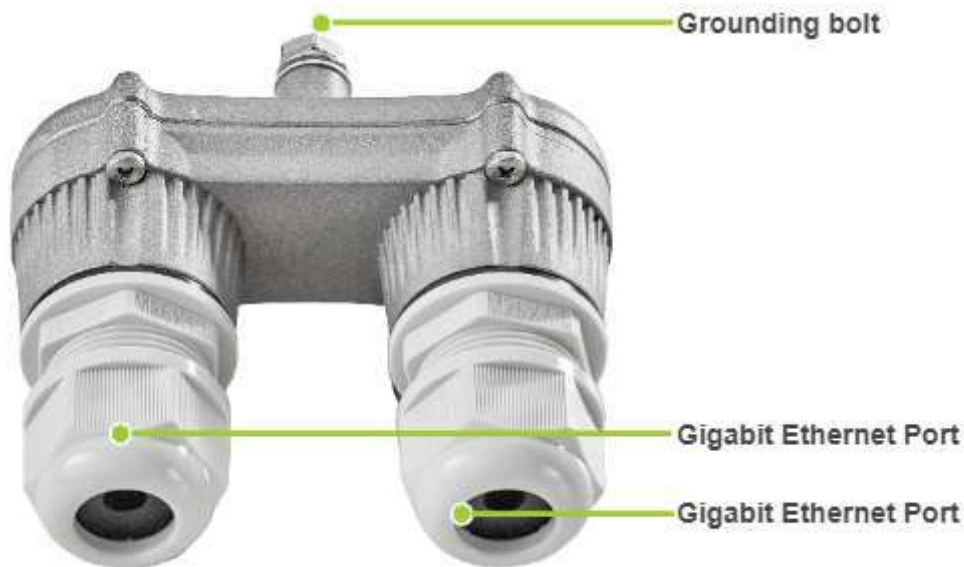


RJ-45 connectors

AUX-ODU-INJ-G is supplied with a worm clamp TORRO 40-60/9 C7 W4 DIN 3017 - 2 pcs. The clamp is made of stainless steel A4, width 9 mm, allows the installation on a mast with a diameter of 35 to 60 mm. In case of mast diameter more than 60 mm, a similar clamps (up to a 230 mm diameter) with a width of up to 12-13 mm can be used.

Lightning protection unit

AUX-ODU-LPU-L



AUX-ODU-LPU-L is a bidirectional external outdoor lightning protection unit for Astra Wireless systems designed to withstand the toughest conditions and protect the outdoor unit or the 3rd party networking equipment installed indoors from sudden power surges induced by lightning strikes. Despite the fact every Astra wireless device has a built-in lightning prote

ction. AUX-ODU-LPU-L, thanks to its superior GR-1089-grade protection, greatly reduces the risk of damage for the systems operating in harsh environments or difficult-to-reach locations. AUX-ODU-LPU-L is compatible with all Astra Wireless devices.

NOTE

The device is not supplied by default and must be ordered separately.

Parameter	Description
Size and Weight	45×92×55.5 mm, 0.13 kg
Connectors and Interfaces	• 2 x Ethernet ports • Ground clamp
Supported Ethernet Modes	10/100/1000 Mbps (Gigabit Ethernet pass-through)
Water and Dust Protection	IP66 and IP67
Operating temperature range	-55 °C ... +60 °C
Opening voltage of the arrester	150 V
Lightning Protection	In compliance with: • GR-1089 • IEC 61000-4-2 (ESD) 15kV (air), 8kV (contact) • IEC 61000-4-4 (EFT) 40A (tp = 5/50ns) • IEC 61000-4-5 (Lightning) L5, 95A (tp = 8/20us) • ETSI ETS 300 386

Ethernet Pin-out

Pin	Data pair
1	A+
2	A-
3	B+
4	C-
5	C+
6	B-
7	D+
8	D-

Packing list



Block



Cable glands



Clamp



RJ-45 connectors

AUX-ODU-LPU-L is supplied with a worm clamp TORRO 40-60/9 C7 W4 DIN 3017. The clamp is made of stainless steel A4, width 9 mm, allows the installation on a mast with a diameter of 35 to 60 mm. In case of mast diameter more than 60 mm, a similar clamp (up to a 230 mm diameter) with a width of up to 12-13 mm can be used.

Packing List

Before the installation, please make sure you have all necessary parts and accessories.

- Outdoor unit (ODU).
- Power supply.
- Cable gland (x3).
- Shielded RJ-45 connector.
- Unshielded RJ-45 connector.
- Mounting kit - universal assembling kit for mounting the ODU on standard pole, wall or thick pipe (vertical/horizontal).
- Power cord - the model depends on the region, according to the Purchase Order.

Planning considerations

During link planning, such factors as distance, obstacles and the link margin should be taken into account. We strongly recommend to use a planner tool for link planning.

Range and obstacles

Make sure that line of sight is provided when planning the antennas' placement for a point-to-point link in order to achieve maximum range and performance between two antennas. Perform a survey to identify all the obstructions (such as trees or buildings) in the path and to assess the risk of interference.

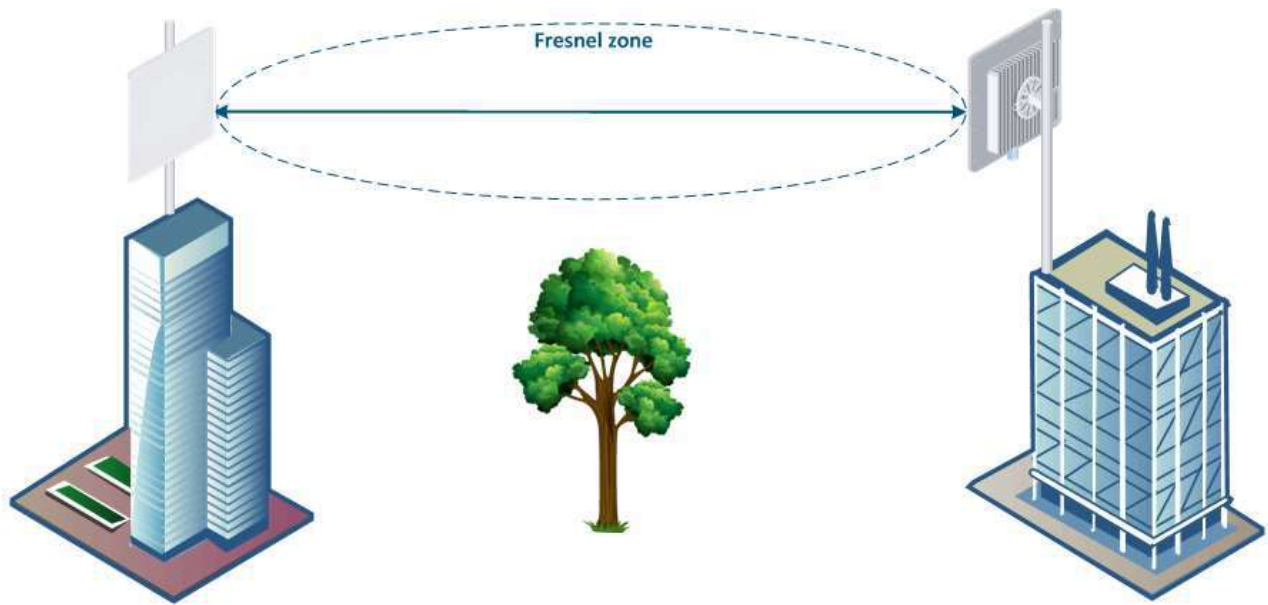
The radio beam is an electromagnetic wave and it is not as thin as a laser beam, for example. The main energy in a radio beam is concentrated along the straight line between the two antennas, inside an area with the shape of an ellipsoid (or a rugby ball). This area is called the 1st Fresnel zone and its exact form and size depend upon the frequency and the signal propagation path length.

If most of the 1st Fresnel zone is obstructed, a major part of the radio wave's electromagnetic energy is lost, which leads to a severe signal quality degradation and as a result to a decreased coverage range or performance.

Below is an incomplete list of possible obstructions along the signal propagation path:

- Neighboring buildings.
- Trees.
- Bridges.
- Power lines.

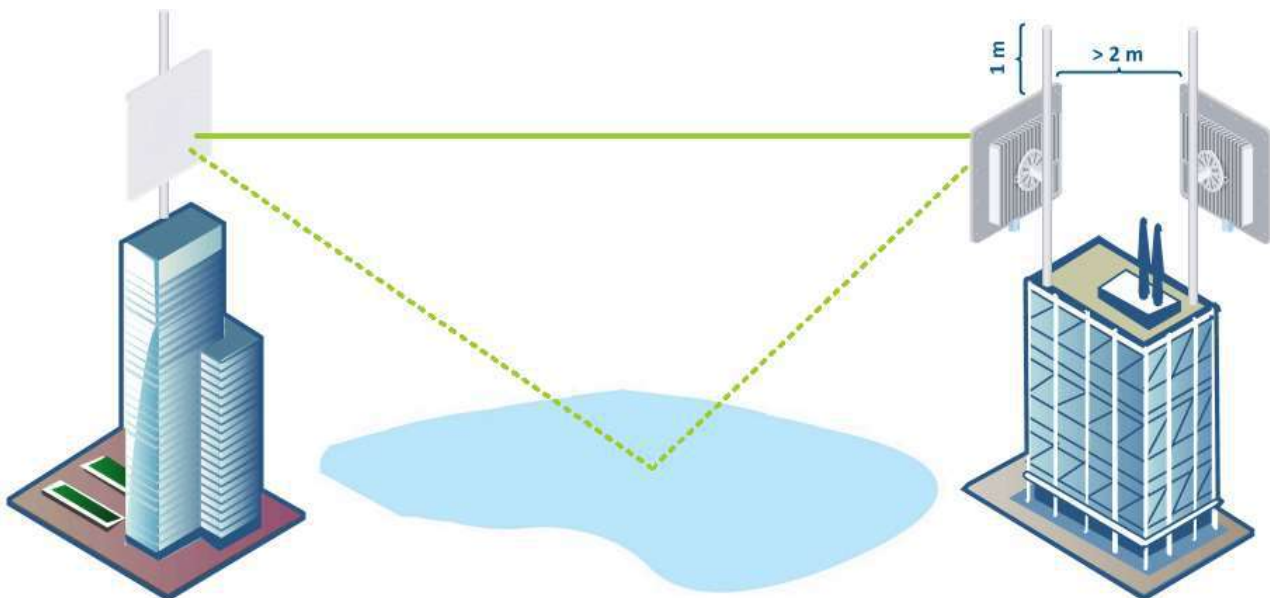
To obtain the best results, it is necessary to perform a precise analysis of the signal propagation path and possible obstructions that may obstruct the 1st Fresnel zone.



Antenna Installation

General recommendations for antenna installation:

- Try to keep the LOS clear of obstructions. In case of installations over vegetation and forest, make sure the direct LOS stays above the trees; in urban environments - above the tallest buildings along the radio path.
- The influence of trees can be variable, depending on the season (ice, dew, leaves). Keep in mind that, during spring and summer, leaves can absorb high levels of radio energy. Therefore, when installing during the cold season, over forests and trees without leaves, try to achieve a higher fade margin.
- Before installation, make sure the devices are located outside the area of water streams and splashes formation, which can affect the enclosure for a long time.
- Install antennas as far as possible from other antennas (the recommended distance is at least 2 meters between edges of the antennas).
- Reflecting surfaces should be considered (buildings with reflective windows, water surfaces or wet grounds). These can be useful in NLOS situations, if there is no direct clear path between the 2 antennas, so the radio signal needs to be reflected by a surface. However, reflections can also decrease the signal quality when encountered along a clear LOS link, because of fading caused by multipath propagation.
- When installing antennas over the water, tune the height bracket within a 1-3 meters range variation, because it can yield significant signal level variations due to multipath fading.



Spectral aggregation

Spectral aggregation should be taken into account when planning composite backhauling links, when installing devices in close proximity to each other on the same pole or in order to implement redundancy and link aggregation. For more information, proceed with the "[Link aggregation, balancing and redundancy](#)" article. The devices located close to each other can cause mutual interference. Do not ignore the spectral aggregation rules, otherwise it can lead to a degradation of the wireless links.

The document will provide recommendations on distance and frequency separation for scenarios with and without an external synchronization hub. An external clock source allows you to synchronize the time (the beginning of each second) on multiple devices, up to 7 devices, with an accuracy of less than a microsecond so that all connected devices can turn on the transmitters at the same time. This completely eliminates the mutual influence of neighboring sectors, when one transmitting device with its powerful signal prevents the neighboring device from receiving weak signals from its terminals. Wireless devices synchronization using AUX-ODU-SYNC makes it possible to reuse the frequency within the same site, that is, devices mounted back to back can operate on the same frequency channels.

Without synchronization

- Distance separation (vertical or horizontal) must be at least two meters between the edges of the antennas.
- Reduce the transmission power.

With synchronization

In case that the synchronization is enabled, in order to achieve the minimum mutual interference between colocated devices, the distance can be reduced to 1 meter.

Synchronization settings

To perform synchronization using an external hub, each base station sector must be connected to an AUX-ODU-SYNC.

The following conditions should be met:

- Frame size and DL/UL ratio should be equal on all sync-end units.
- The automatic downlink ratio selection is not allowed.

 NOTE

The AUX-ODU-SYNC antenna is not included in the standard packing list.

Link Pre-configuration in the lab

Usually, before going into the field, it is recommended to pre-configure in the lab the Astra Wireless units to verify the link establishment. Take the units out of the package and place them on the table.

NOTE

A minimum set of requirements must be met during devices pre-configuration in the lab:

- Make sure that devices are positioned in such a way so that they are not directed right at each other to prevent device damage.
- In case of connectorized model configuration, it is recommended to connect the two devices in the link directly, with RF cables and RF attenuators with attenuation of at least 40 dB for each polarization (installation\deinstallation of the RF attenuators and RF cables should only be performed when the devices are switched off).
- In case an external antenna or the other unit in the link is connected to only one N-type connector do not switch on the unit.

Step 1: Scheme connection assembling

The equipment list required for the lab configuration:

1. Outdoor units - 2 pcs.
2. Power supply - 2 pcs.
3. Power cord - 2 pcs.
4. Ethernet cables - 4 pcs.
5. Laptop with Ethernet port available.

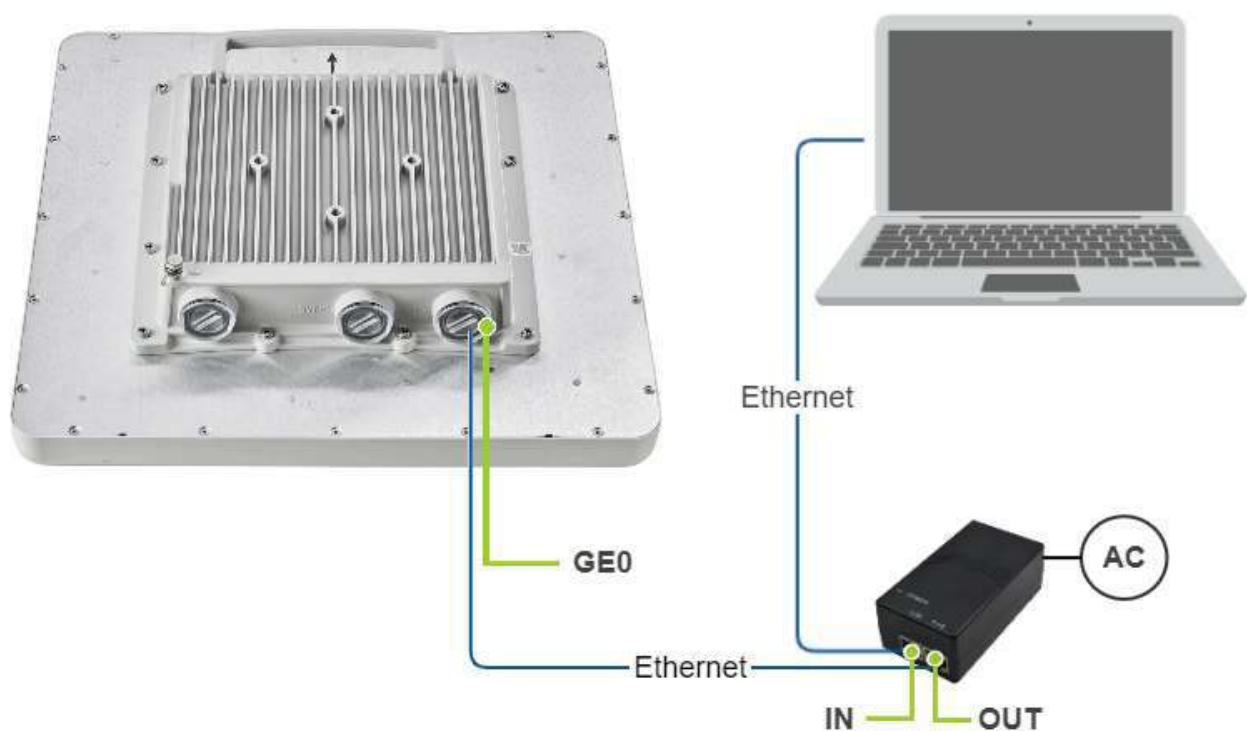
We will perform the settings mentioned below for each unit and check if the wireless link was established correctly.

Use the following instruction to assemble a test scheme:

1. Connect Gigabit Ethernet port at the ODU to the power supply port labeled as "OUT".
2. Connect Ethernet port at the laptop to the power supply port labeled as "IN".
3. Connect the power cord to power supply and plug it to AC mains.

 NOTE

Connecting third-party equipment via Ethernet (switches, PCs), make sure the PoE, Energy Efficient Ethernet and Green Ethernet functions are disabled on the network interfaces connected to Astra Wireless devices.



Step 2: Access to the device

Let's access each unit to the default IP address 10.10.10.1 with mask 255.255.255.0 via a web browser. Before, make sure the Ethernet port of the Laptop has an IP address assigned from the same subnet as the one for the unit (e.g., set 10.10.10.10 with mask 255.255.255.0).

 NOTE

We assume that each unit used in this setup has not been configured before and runs with the factory settings.

Use any letters or numbers for the initial authentication on each unit, for example:

- Login: login.
- Password: password.

 NOTE

We strongly recommend to change your login and password after the first login.

After the first login, let's configure a distinctive name for each unit and set a custom login and password. Go to the "Settings" → "General" section and configure:

- Device Name (e.g., Master/Slave).

Go to the "Settings" → "Security" → "Change admin password" and configure:

- Login (e.g., admin).
- Password (e.g., admin).

 NOTE

At the next login, type "admin" for the Login and Password (if these are the credentials set before) to access the unit in the privileged mode.

Step 3: Firmware upgrade

Let's upgrade each unit to the latest stable firmware version. In case the laptop has an access to the Internet, a new software version will be detected automatically, update on both devices.

Otherwise, the manual firmware upgrade process should be performed:

- Download latest release from the ftp server <https://ftp.astrawireless.net/pub/Firmware>.
- In the "Maintenance" section click the "Select file" button and set the path to the downloaded file, or drag it to the specified area.
- File will be uploaded to the device. Changes will take force after reboot.

Firmware



Upload firmware
Select file or drag it here

Current version: H16S31-MINTv5.0.0-12 rev:ad6e131

Build time: May 27 2025 18:32:41 (save)

Configuration



Upload configuration
Select file or drag it here

 Save configuration Show configuration

Step 4: Radio parameters configuration

Let's configure the minimum needed radio parameters to establish the link.

At the both units, go to the "Settings" → "Radio" section and set this unit with:

- Link ID parameter, it must be the same on both sides of the link
- Center frequency use values selected at the Link Planning stage.
- Channel width: use value selected at the Link Planning stage.
- Power limit: set the minimum value in the range, as currently, we are in the lab, and we don't need high output power.

The rest of parameters remain with the default values.

Link Settings

Link-id:

Center frequency, MHz:

Channel width, MHz:

Power Settings

EIRP: 33 dBm

Power limit, dBm:

Cable loss, dB:

Antenna gain, dBi:

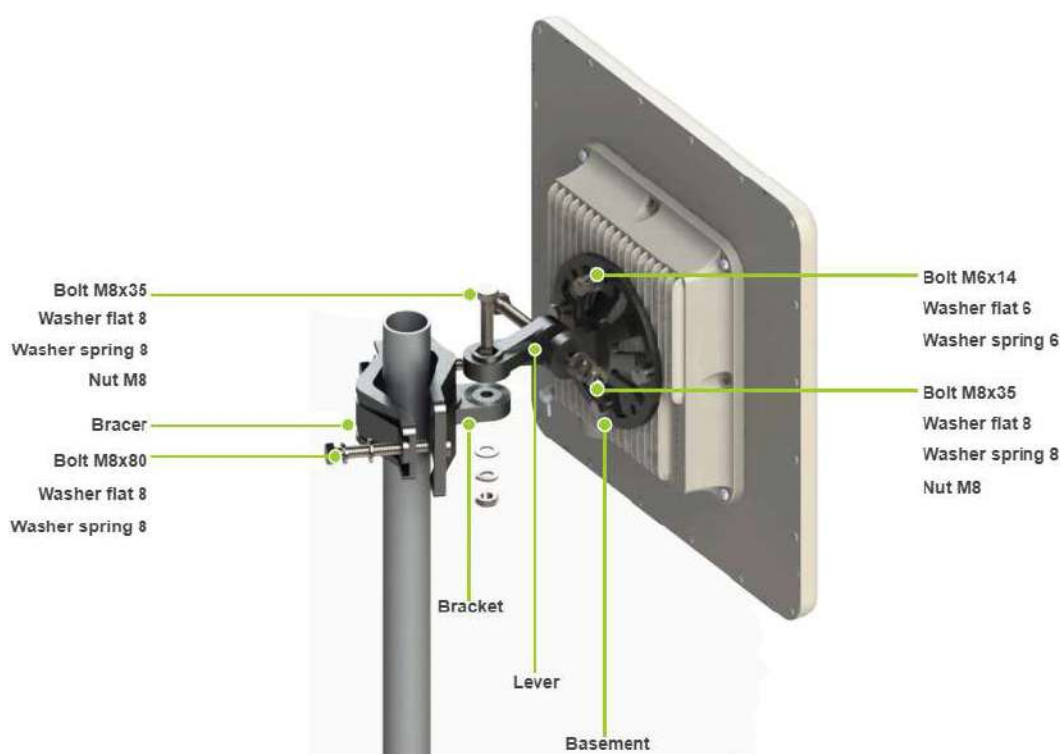
Step 5: Check the wireless link status

Let's apply all settings described above for each unit and go to the "Dashboard" section and check if the device status has changed to "Connected".

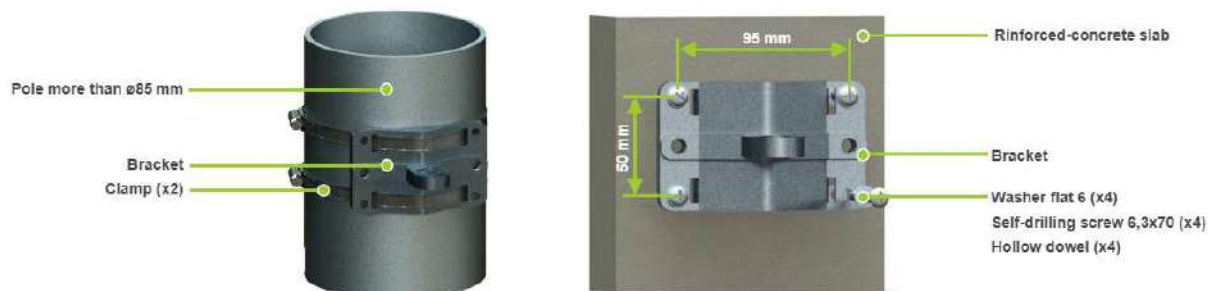
Installation

Mounting kit

MONT-KIT-85 | MONT-KIT-85S is supplied with all models by default. It allows to make reliable and easy installation of the unit with two-axis adjustment. Assemble the Mounting kit according to the scheme below. The nut must be tightened until the spring washer clicks, without over-tightening.



Mounting is carried out on a pole with a diameter 30-85 mm. There are also possible options for mounting on a wall or pole with a diameter more than 85 mm.



 NOTE

Clamps and other optional fasteners are not included in the Mounting kit MONT-KIT-85.

Cable Gland Assembly

Cable Gland Assembly for RJ-45 connector

Required components are listed below.

1. Unshielded RJ-45 connector.
2. Shielded RJ-45 connector.
3. FTP Cat5e cable.
4. Cable gland:
 - Cable gland nut.
 - Split sealing grommet (with inner diameter 7 mm).
 - Cable gland threaded coupling.
5. Crimping tool for RJ-45 connector.

 NOTE

The outside diameter value of the FTP Cat5e cable should not exceed 7 mm.

Cable gland can be assembled on pre-crimped cable.

Assemble procedure

In order to ensure that the device case remains sealed under any environmental conditions follow the assemble procedure:

- **Step 1:** Crimp the standard RJ-45 connector onto the cable using crimping tool. Pin-out scheme: T568B wiring standard.

**CAUTION**

Make sure that the RJ-45 connector is well-crimped. A loose connector can damage the device. Please note that such damage is not covered by the warranty.

Do not use the shielded RJ-45 connector on this end of the cable as it should be attached on the power supply unit end.

- **Step 2:** Assemble cable gland nut, the split sealing grommet and the cable gland threaded coupling onto the pre-terminated cable as shown on the figure below.
- **Step 3:** Insert the split sealing grommet into the cable gland threaded coupling.
- **Step 4:** Insert the RJ-45 connector into the device socket until you hear a click.
- **Step 5:** Screw the cable gland threaded coupling into the port and tighten it. Do not apply excessive force.
- **Step 6:** Tighten the cable gland nut (4). Do not apply excessive force.

Cable Gland Assembly for Optical Cable

Required components are listed below.

1. Optical cable.
2. Optical connector.
3. SFP module.
4. Cable gland:
 - Cable gland nut.
 - Split sealing grommet (with inner diameter 3.2 mm).
 - Cable gland threaded coupling.

Assemble procedure

- **Step 1:** Put the cable gland nut, the split sealing grommet and cable gland threaded coupling onto the optical cable as shown on the figure below.
- **Step 2:** Insert the split sealing grommet into the cable gland threaded coupling.
- **Step 3:** Set the SFP module into the socket until you hear a click.
- **Step 4:** Insert the optical connector into the SFP module.
- **Step 5:** Screw the cable gland threaded coupling into the port and tighten it.
- **Step 6:** Tighten the cable gland nut. Do not apply excessive force.

**NOTE**

In order to disassemble SFP, please disconnect the optical cable, pull the clip of the SFP module and withdraw the SFP module from the slot.

SFP module is not included into the packing list. Is possible to use an SFP (Small Form-factor Pluggable) transceiver of any manufacturer that meets the MSA (MultiSource Agreement) standard.

Mounting

Pre-installation

Required tools

- Screwdriver set.
- Pliers / pipe wrench.
- Wrench set.

Additional equipment

- GPS receiver.
- High magnification binoculars.

**CAUTION**

Before mounting the equipment in an outdoor environment, please make sure that:

- You acknowledge the regulations imposed by the Regulatory Authority for Communications in your country for the radio spectrum to be used.
- You chose known locations for the installation of the links; although Astra Wireless devices can also operate in Near-LoS or Non-LoS conditions, to achieve the best performance, it's highly recommended to install the link in locations where Clear-Line-of-Site and clear channels are available.
- You performed link planning using the planning tool to determine the link path profiles, radio equipment placement requirements, etc.
- You met requirements described in the section "Planning considerations" - > "Wireless device placement".

Installation Procedure

1a. In case of device with removable parabolic antenna, to mount the reflector to Quasar, proceed as follows:

- Match the antenna reflector with the cover of the outdoor unit to coincide the cut parts of the antenna and the slots of the enclosure to prevent rotation of the antenna during operation.
- Install the sealing metal ring of the feeder on top of the antenna reflector, screw the feeder into the hole to press the reflector to the device enclosure.
- Tighten the feeder with a 45 mm wrench with a force of 700-800 Nm.

1b. In case of device with external antenna, to mount and connect an external antenna to Quasar, proceed as follows:

- Mount the antenna(s) according to manufacturer's instructions;
- Connect the ODU V and H N-type interfaces to the antenna(s) with RF coaxial cables and with appropriate connectors. Use cables not longer than 3 m (9.8ft). Tighten the N-type connectors to a torque setting of 1.7 Nm (1.3 lb ft);
- Form drip loops near the cable ends at the ODU's side so that water doesn't creep towards the ODU connectors;
- Weatherproof the N-type connectors (when antenna alignment is complete) using PVC tape and self-amalgamating rubber tape;
- Weatherproof the antenna connectors in the same way (unless the antenna manufacturer specifies a different method);
- Fix the antenna cables to the supporting structure using site approved methods. Ensure that no undue strain is placed on the ODU or antenna connectors. Ensure that the cables do not flap in the wind, as flapping cables are prone to damage and induce unwanted vibrations in the supporting structure.

**CAUTION**

In order to prevent device damage make sure that antenna is connected to both N-type connectors with serviceable RF cables before switching on.

Install ODU connector facing down using the mounting kit. Do not tighten the fasteners to the end until the alignment is completed.

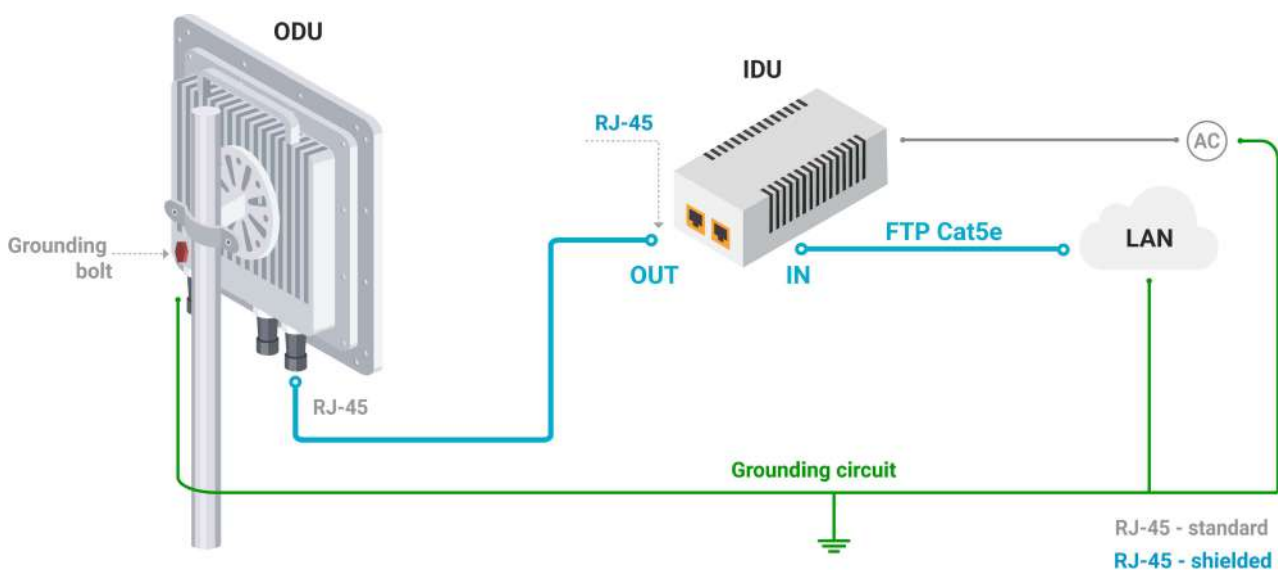
2. Connect the Cat5e FTP cable with the cable gland to ODU.
3. Perform ODU grounding.
4. Lay the Cat5e FTP cable from ODU to the power supply.
5. Connect the Cat5e FTP cable with a shielded connector covered by a cap to the "OUT" port of the power supply, having previously touched the power supply connector case with FTP cable connector case.
6. Perform the power supply grounding.
7. Connect the laptop using Cat5e FTP cable to the power supply "IN" port.
8. Connect the power cord to the power supply and then to the power circuit.

⚠ CAUTION

The power supply must not operate near a direct heat source, near water or in an environment with high humidity. The cables must be connected in such a way to prevent water flow to the power supply connectors.

Use mains supply cords that adhere to safety regulations of the country where the equipment is getting deployed.

Make sure a small loop (at least 10 cable diameters) is provided before the Cat5e FTP cable enter into the building.



⚠ CAUTION

Please note that the pressure equalization system in Astra Wireless devices is performed via gas exchange through a cable gland and Ethernet cable jacket with a dry room where the power supply is installed. In order to avoid ODU failure due to moisture entering the device, for example, during the pressure drop during the rain, the cable gland assembly requirements should be met and there should be no cracks in the Ethernet cable jacket.

In addition, you should avoid the Ethernet cable bending near the ODU and pinching with clamps, that can bring to the pressure equalization system fault between the internal volume of the sealed ODU and the external environment during a sudden air temperature change. This may lead to the leakage and device failures.

Grounding and lightning protection

This section describes factors to be considered when planning the proposed link end sites, including grounding, lightning protection and equipment location for the wireless device, power supply, AUX-ODU-LPU-L unit (if installed).

**CAUTION**

Electro-magnetic discharge (lightning) damage is not covered under warranty. The recommendations in this document, when followed correctly, give the user the best protection from the harmful effects of EMD. However 100% protection is neither implied nor possible.

Grounding and lightning protection recommendations

- The wireless device should be placed on the pole at a height that is at least 1 meter below the top of the pole. In this case, there is a significant probability that the lightning strikes the pole and not the wireless device. The pole should be properly grounded: connected to the building lightning protection circuit according to your local regulations.
- All equipment must be connected at stabilized and surge protected power sources which must be properly grounded.
- The end of the FTP service cable that is connected to the power supply should be assembled with a shielded RJ-45 connector. The other end of the FTP service cable (connected to the wireless device) should be assembled with unshielded (standard) RJ-45 connector.
- The power supply is grounded via a three-conductor power cord and a grounded socket.
- AUX-ODU-LPU-L and wireless device grounding is performed using grounding bolt.
- Antenna pole and wireless device should be connected to the common ground ring. Grounding cables should be no less than 10AWG thick and must use corrosion-resistant connectors. Grounding bolt is included in the supply list, M6×10 for BS devices, M5×10 for ST devices.

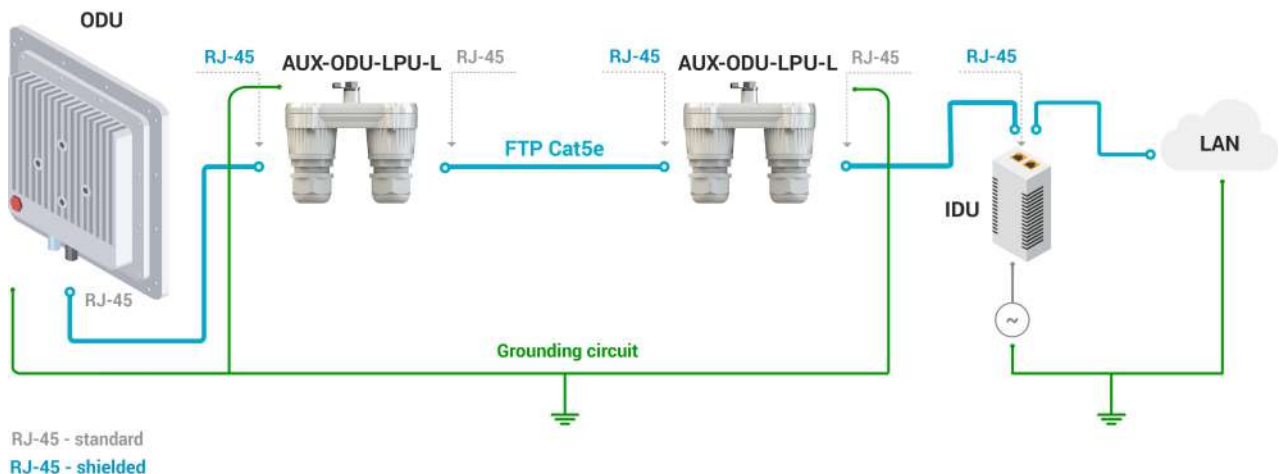
Requirements to the lightning protection unit AUX-ODU-LPU-L location

AUX-ODU-LPU-L is an optional accessory which may be used to serve as a line protection unit for the ODU and for the indoor network equipment connected to the Ethernet port of the IDU. AUX-ODU-LPU-L should be properly assembled, mounted and grounded.

General recommendations for installations of lightning protection units:

- Install the lightning protection unit on both ends of the cable to protect both the outdoor and the indoor unit. The purpose of the LPU at the top is to protect the ODU from a surge of lightning strike which can hit the long FTP cable run along the height of the pole or on the roof of the building. The purpose of the LPU at the bottom is to protect the IDU and customer equipment.
- Use the lightning protection unit to protect all circuits for signal transmission and power supply (video, audio, management signals, Ethernet, etc.)
- Regularly (especially before the periods with high thunderstorm activity) check the integrity of lightning protection units, grounding elements and bonding conductors.
- The ports of the AUX-ODU-LPU-L device are symmetrical, i.e. the correspondence of ports position to the external unit and the power supply does not matter.

Make sure to install the two LPU devices as shown in the scheme below.



⚠ CAUTION

Please note grounding cables should not be connected to the mast. All devices must use separate grounding cable that should be connected to the grounding circuit. The best scenario is when grounding cables are lined parallel to the Ethernet cable.

AUX-ODU-LPU-L Mounting

AUX-ODU-LPU-L is installed on a mast, using clamp. Attach the grounding cable (min cross-section 2.5 mm²) to the case, using grounding bolt. An M6×10 grounding bolt is included in the supply list.



During AUX-ODU-LPU-L mounting it is necessary to provide a small loop of the FTP cable that should be below the cable gland. This ensures that water is not constantly channeled towards the connector. It will also serve as a cable compensation for the cable linear expansion as the temperature difference result.



 CAUTION

Missing or bad grounding may leave the unit vulnerable to lightning damage.

AUX-ODU-LPU-L Cable Ggland Assembly

In order to ensure that the cable gland remains sealed under any environmental conditions, please, follow the assembly sequence according to the procedure below:

- **Step 1:** Insert the sealing insert into the clamping claw.
- **Step 2:** Assemble the cable gland by putting the thread-lock sealing nut, clamping claw with sealing insert and body onto the cable as shown on the figure.
- **Step 3:** Insert the clamping claw with sealing insert into the body as shown on the figure.
- **Step 4:** Crimp the standard RJ-45 connector onto the cable using crimping tool. Pin-out scheme: T568B wiring standards.

 CAUTION

Make sure that the RJ-45 connector is well-crimped. A loose connector can damage the device. Please note that such damage is not covered by the warranty.

- **Step 5:** Insert the RJ-45 connector into the corresponding socket until you hear a click.
- **Step 6:** Screw the cable gland body into the port and tighten it. Do not apply excessive force.
- **Step 7:** Tighten the thread-lock sealing nut. Do not apply excessive force.



Antenna Alignment

General recommendations

- It is recommended to have two teams prepared for alignment procedure, each team with at least two members: one should take the signal readings and communicate with the remote end, the other should manipulate the antenna.
- For rough alignment use the azimuth, elevation angle and suspension height from planner tool report.
- On the device case there is a scale indicating the received signal level. The more often indicator flashes, the better quality of the connection. Blinking indicator shows an intermediate state, the more often indicator is blinking, the higher the connection level.
- For more accurate alignment, use the alignment tool built into the device web interface.
- After the initial alignment, the device at the remote side must be fixed. Firstly, the alignment is performed for one device, then for another.



Alignment tool

Use the Alignment tool to point and optimize the antenna in the direction of maximum link signal. The built-in graphical antenna alignment tool displays the signal levels for both devices and both polarizations, this makes an alignment process fast and accurate.

To achieve the best performance, RSSI level current values should be -60 ... -40 dBm.

Alignment

Local device

Current values:

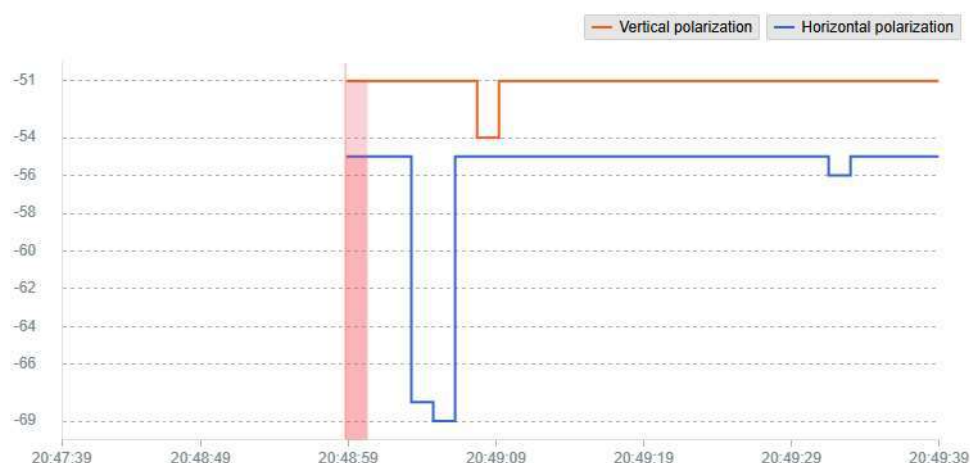
Vert.: -51 dBm

Hor.: -55 dBm

Max. values:

Vert.: -51 dBm

Hor.: -55 dBm



Remote device

Current values:

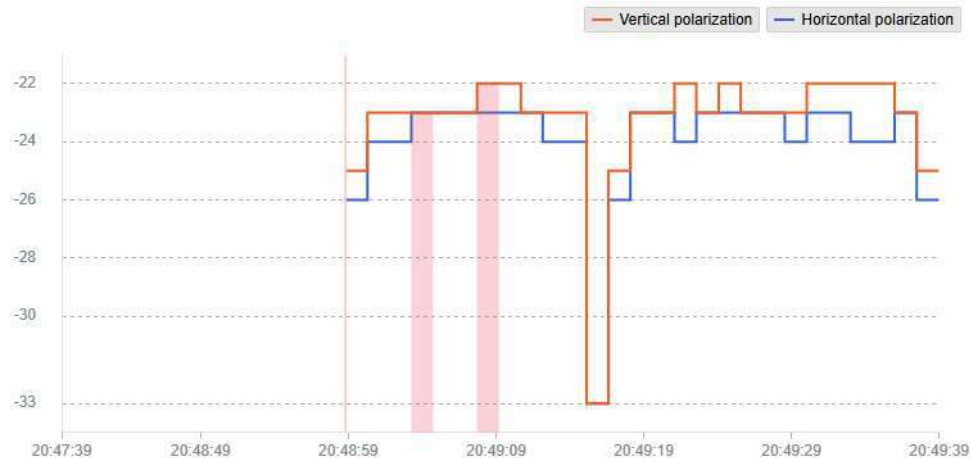
Vert.: -25 dBm

Hor.: -26 dBm

Max. values:

Vert.: -22 dBm

Hor.: -23 dBm



⏏ Stop alignment

↓ Save as PNG

Operation & Administration

To make changes in the device configuration click the "Changes" button in the upper right corner of the web interface.

Name	Center frequency	Channel width	Tx local	Power, dBm	MCS	Throughput, Mbps	RSSI, dBm	EVM, dB
Quasar_master1	4940 MHz	80 MHz	0	0	11	0	-51 -55	-24 -24
			Tx remote	0	0	0	Rx local	-32 -35
							Rx remote	-52 -50

[Changes](#)

Radio Settings

Link Settings

Link-id:

123

Center frequency, MHz:

5040

Channel width, MHz:

160

The "Applying global changes" window contains a table of parameters whose values have been changed by the user. If you want to undo one change, click the "Roll back" button near the entry. If you need to undo all changes, use the "Roll back all" button at the bottom of the window. Changes will be saved to the device configuration by clicking the "Apply" button.

Applying global changes

Name	Original value	New value	Roll back
Radio Settings Link Settings Center frequency, MHz Channel width, MHz	4940	5040	
	80	160	

Apply

Try

Roll back all